



Family 15h Models 00h-0Fh AMD Opteron™ Processor Product Data Sheet

Publication # **49687**
Revision: **3.00**
Issue Date: **November 2011**

© 2011 Advanced Micro Devices, Inc. All rights reserved.

The contents of this document are provided in connection with Advanced Micro Devices, Inc. (“AMD”) products. AMD makes no representations or warranties with respect to the accuracy or completeness of the contents of this publication and reserves the right to make changes to specifications and product descriptions at any time without notice. The information contained herein may be of a preliminary or advance nature and is subject to change without notice. No license, whether express, implied, arising by estoppel or otherwise, to any intellectual property rights is granted by this publication. Except as set forth in AMD’s Standard Terms and Conditions of Sale, AMD assumes no liability whatsoever, and disclaims any express or implied warranty, relating to its products including, but not limited to, the implied warranty of merchantability, fitness for a particular purpose, or infringement of any intellectual property right.

AMD’s products are not designed, intended, authorized or warranted for use as components in systems intended for surgical implant into the body, or in other applications intended to support or sustain life, or in any other application in which the failure of AMD’s product could create a situation where personal injury, death, or severe property or environmental damage may occur. AMD reserves the right to discontinue or make changes to its products at any time without notice.

Trademarks

AMD, the AMD Arrow logo, AMD Opteron, AMD Virtualization, AMD-V, and combinations thereof are trademarks of Advanced Micro Devices, Inc.

HyperTransport is a licensed trademark of the HyperTransport Technology Consortium.

MMX is a trademark of Intel Corporation.

Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies.

Revision History

Date	Revision	Description
November 2011	3.00	Initial Public Release.

1 Features

The following is a list of features and capabilities of the Family 15h Models 00h-0Fh AMD Opteron™ processor.

- **Compatible with Existing 32-Bit and 64-Bit Code Base**
 - Including support for SSE, SSE2, SSE3, SSE4a, SSE4.1, SSE4.2, SSSE3, ABM, AVX, AES, XSAVE/XRSTOR, PCLMULQDQ, FMA4, XOP, MMX™, and legacy x86 instructions
 - Runs existing operating systems and drivers
 - Local APIC on the chip
 - Light Weight Process (LWP) support
- **AMD64 Technology**
 - AMD64 technology instruction-set extensions
 - 64-bit integer registers, 48-bit addresses
 - Sixteen 64-bit integer registers
 - Sixteen 128-bit SSE/SSE2/SSE3/SSE4a registers
- **Family 15h Architecture**
 - FPU shared between the two cores of a Compute Unit (CU)
 - Support for up to 8 cores per node
- **Machine-Check Architecture**
 - Includes hardware scrubbing of L3 ECC-protected arrays
- **Cache Structures**
 - **16-Kbyte 4-Way Associative, Write-through ECC-Protected L1 Data Cache per Core**
 - Two 64-bit operations per cycle, 3-cycle latency
 - **64-Kbyte 2-Way Associative Parity-Protected L1 Instruction Cache Shared between Both Cores of a CU**
 - With advanced branch prediction
 - **2048-Kbyte 16-Way Associative ECC-Protected L2 Cache Shared between Both Cores of a CU**
 - Exclusive cache architecture storage in addition to L1 caches
 - **8192-Kbyte (8-Mbyte) Maximum 64-way Associative Cache Shared between All Cores on a Node**
 - Shared cache architecture storage in addition to exclusive L1 and L2 caches
- **Flexible Floating-Point Unit**
 - 256-bit shared or two dedicated 128-bit floating-point units (FPU)
 - Shared between the two cores of a CU
- **Management and Virtualization Features**
 - Advanced Platform Management Link (APML)
 - SMBus v2.0-compatible interface
 - Remote-Management Interface (SB-RMI)
 - AMD Virtualization™ technology (AMD-V™)
 - SVM pause count capability
 - SVM disable and lock
 - Rapid virtualization indexing (nested paging)
 - Improved world-switch speed

• Power Management

- Multiple low-power states
- Advanced Power Management
- AMD Turbo CORE technology 2.0 with per core power gating
- AMD PowerCap
- System Management Mode (SMM)
- Hardware Thermal Control (HTC)
- ACPI-compliant, including support for processor performance states
- Supported power states: C0, C1, C1E, C6, CC6, S0, S3, S4, and S5
- Effective frequency interface

• Electrical Interfaces

- DDR3 SDRAM: Compliant with JEDEC DDR3 1.5-V, LV-DDR3 1.35V and 1.25V SDRAM specifications
- Refer to the *AMD Family 15h Models 00-0Fh Processor Electrical Data Sheet*, order# 47079, for electrical details of AMD Family 15h processors.

• HyperTransport™ Technology

- HyperTransport™ 3 technology supported
- Link Speed PowerCap
- Link Width PowerCap
- Maximum four (4) links on G34 package and three (3) links on C32 package, 16-bits in each direction, supporting up to 2000 MT/s (4.0 GB/s) in each direction in HyperTransport Generation 1.0 mode and up to 6400 MT/s (12.8 GB/s) in each direction in HyperTransport Generation 3.0 mode

• Integrated Memory Controller

- AMD Memory Controller PowerCap
- Low-latency, high-bandwidth
- DRAM Prefetcher:
 - Adaptive prefetching support
 - 32-entry DRAM prefetch table
 - Differentiate between core prefetch requests and core demand requests
- ECC checking with double-bit detect and single-bit correct
- 144-bit DDR3 SDRAM controller operating at frequencies up to 1866 MT/s (933 MHz)
- Package C32
 - Supports up to four (4) unbuffered DIMMs
 - Supports up to six (6) registered DIMMs
 - Supports up to six (6) load-reduced DIMMs
- Package G34
 - Supports up to eight (8) unbuffered DIMMs
 - Supports up to twelve (12) registered DIMMs
 - Supports up to twelve (12) load-reduced DIMMs

• Available Packages

- Compliant with RoHS (EU Directive 2002/95/EC) with lead used only in small amounts in specifically exempted applications
- C32 package
 - Refer to the *Socket C32 Processor Functional Data Sheet*, order# 47390, for functional and mechanical details of the socket C32 package processor.
 - 1207-land lidded LGA package
 - 1.10-mm land pitch
 - 35-row x 35-col land array
 - C4 die attach

- G34r1 package
 - Refer to the *Socket G34 Processor Functional Data Sheet*, order# 45937, for functional and mechanical details of the socket G34 package processor.
 - 1944-land lidded LGA package
 - 1.00-mm land pitch
 - 57-row x 40-col land array
 - C4 die attach

2 Compatible Socket Infrastructures

Refer to the AMD *Infrastructure Roadmap*, order# 41842, for information on platform-feature implications of package and socket-infrastructure combinations. Family 15h Models 00h-0Fh AMD Opteron™ processors support the following socket infrastructures:

- **Socket C32 Socket Infrastructure**
 - Compatible with socket C32 package processors
 - Refer to the *Socket C32 Processor Functional Data Sheet*, order# 47390, for functional and mechanical details of the socket C32 package.
- **Socket G34 Socket Infrastructure**
 - Compatible with socket G34 package processors
 - Refer to the *Socket G34 Processor Functional Data Sheet*, order# 45937, for functional and mechanical details of the socket G34 package.